

Effect of *Candida tropicalis* biofilm on urinary epithelial cells

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Abstract

Candida tropicalis has been reported as one of the *Candida* species which is most likely to cause bloodstream and urinary tract infections in hospitals being responsible for a high rate of patients' mortality. A substantial amount of *Candida* infections is associated with biofilm formation, especially on the surface of implanted medical devices. Hence, the colonization of indwelling devices, like urinary catheters, by *C. tropicalis* is considered a critical problem. Moreover, biofilm cells are known to detach and then be able to colonize other surfaces, as host cells. Adhesion to and invasion of host cells by *Candida* is considered the first step to initiate systemic infections.

Thus, the aim of this study was to investigate the influence of *C. tropicalis* biofilm, formed on catheter material (silicone), on human urinary bladder cells.

This study was conducted with one isolate of *C. tropicalis* obtained from a patient with candiduria admitted to the intensive care unit at the University Hospital in Maringá (Paraná, Brazil) and with *C. tropicalis* ATCC 750, as a control. Adhesion assays were performed incubating silicone coupons, with pre-formed *C. tropicalis* 24h biofilm, with a confluent layer of

epithelial cells (TCC-SUP), at 37°C. The extent of adhesion was evaluated after 2 h of incubation, using an adaptation of the crystal violet staining method. Moreover, cells viability was also assessed, after contact with yeasts, either by trypan blue staining and using 3-(4,5-dimethylthiazol-2-yl)-5-(3-carboxymethoxyphenyl)-2-(4-sulfophenyl)-2H-tetrazolium (MTS) viability assay.

Although the clinical isolate produced more biofilm on silicone, both strains adhered in the same extent to epithelial cells after 2h of biofilm contact. Moreover, concerning the effect of the clinical isolate biofilm on epithelial cells it is interesting to note that some cell death was induced, being approximately two times higher than the control. Furthermore, *C. tropicalis* reference strain biofilm causes a reduction on epithelial cell activity, which was not verified in the presence of the clinical isolate.

Hence, it is possible to conclude that *C. tropicalis* were able to cause epithelial cell death and inhibition of cellular activity when in biofilm form. This highlights the importance of biofilm formation, associated to the use of urinary catheters, on *C. tropicalis* virulence.